

What is claimed is:

1. A phonetic data processing system comprising:

- A. a computer processing device having access to a memory;
- B. a rich semantic grammar (RSG) stored in said memory and comprising one or more grammars comprising syntactic information and semantic information; and
- C. a phonetic data processing module, executable by said processing device, said module comprising:

- (1) a phonetic searcher, configured to generate, as a function of said RSG and a received phonetic stream comprised of phonetic estimates, a set of sequences comprising a set of best words from said RSG corresponding to said phonetic estimates; and
- (2) a semantic parser module, configured to generate a set of semantic data from said sequences and said RSG, wherein said set of semantic data includes all valid interpretations of the sequences.

2. A system as in claim 1, wherein each of said sequences comprises set of words combined to define word paths.

3. A system as in claim 1, wherein said phonetic searcher is configured to extract a context free grammar (CFG) comprising syntactic information from said RSG and is further configured to access said CFG to generate said set of best words.

1 4. A system as in claim 1, wherein each of said phonetic estimates has a fixed start time
2 and a plurality of end times, and wherein there is a score associated with each end time
3 corresponding to the likelihood that a given phonetic estimate is a word or a syllable in
4 said RSG.

1 5. A system as in claim 4, wherein said phonetic searcher includes a grammar builder
2 configured to selectively combine words from said set of best words into sequences, as
3 a function of the start time and end times of said phonetic estimates corresponding to
4 said words.

6. A system as in claim 5, said phonetic searcher is configured to combine said words
using dynamic programming.

7. A system as in claim 1, wherein said RSG is a grammar tree comprising nodes having
certain of said syntactic and semantic information associated with each of a plurality of
said nodes.

1 8. A system as in claim 1, wherein said semantic information includes one or more
2 categories, and each category dictates an interpretation of a corresponding word.

1 9. A system as in claim 1, wherein said semantic information includes one or more
2 operators, and each operator defines a manner of combining a plurality of words.

1 10. A system as in claim 1, further comprising:

- 2 (3) an application program, configured to receive said set of semantic data and to
3 define context information associated with said phonetic stream;
4 (4) a semantic evaluator, configured to interpret said set of semantic data in
5 accordance with said context information and to derive a linguistic result
6 therefrom.

1 11. A system as in claim 10, wherein said set of semantic data is represented as a tree of
2 nodes representing all valid interpretations of said word sequences and said semantic
3 evaluator is configured to determine a category at each node, as a function of said
4 context information, and to apply to values at each node a corresponding category to
5 determine said linguistic result.

1 12. A system as in claim 1, wherein said set of semantic data is a semantic tree comprised
2 of a set of nodes representing all valid interpretations of said sequences.

1 13. A method of processing phonetic data, comprising:

- 2 A. defining in a memory a context free rich semantic grammar (RSG) comprising
3 syntactic and semantic information;
4 B. receiving a phonetic stream comprising phonetic estimates;
5 C. generating a set of sequences comprised of best words, as a function of said
6 RSG and said phonetic stream;

7 D. generating, from said sequences and said RSG, a set of semantic data including
8 all valid interpretations of said sequences.

1 14. A method as in claim 13, wherein each of said sequences is comprised of a set of words
2 combined to define word paths.

1 15. A method as in claim 13, wherein said phonetic searching includes extracting a context
2 free grammar comprising syntactic information from said RSG.

16. A method as in claim 13, wherein said phonetic searching includes:
(1) determining for each of said phonetic estimates a fixed start time and a plurality
of end times; and
(2) determining a score associated with each end time corresponding to the
likelihood that a given phonetic estimate is a word or a syllable in said RSG.

17. A method as in claim 16, wherein said phonetic searching further includes:
(3) combining said words from said set of best words into said sequences, as a
function of the start time and the end times of said phonetic estimates
corresponding to said words.

1 18. A method as in claim 16, wherein said phonetic searching includes:
2 (3) combining said words using dynamic programming.

1 19. A method as in claim 13, wherein said RSG is a grammar tree comprising nodes having
2 certain of said syntactic and semantic information associated with each of said nodes.

1 20. A method as in claim 13, further including:

2 E. defining a context associated with said phonetic stream by an application
3 program; and

4 *AM* F. interpreting said set of semantic data with a semantic evaluator, in accordance
5 with said context, and deriving a linguistic result therefrom.

1 21. A method as in claim 20, wherein interpreting said set of semantic data includes, for
2 each node, determining a category at a given node, as a function of said context, and
3 applying said category to interpret values at said given node.

1 22. A method as in claim 13, wherein generating said set of semantic data includes
2 generating a semantic tree instance comprised of a set of nodes representing all valid
3 interpretations of said sequences.

1 *23.* A phonetic searcher, coupled to a database comprising a context free grammar
2 including syntactic information, and configured to receive a phonetic stream of data and
3 to generate a word list representing all valid words represented by said phonetic stream,
4 as a function of said RSG.

1 *24.* A grammar builder coupled to a database comprising a context free grammar, including

2 syntactic information, and coupled to a database comprising a set of valid words
3 corresponding to a stream of phonetic estimates, wherein each of said phonetic
4 estimates is represented as having a fixed start time and a plurality of end times, and
5 wherein said grammar builder is configured to selectively combine words from said set
6 of words as a function of said fixed start time and said end times of phonetic estimates
7 corresponding said words to be combined.

1 25. A grammar builder as in claim 24, wherein for each phonetic estimate, a score is
2 associated with each of said end times, and wherein said score is related to a probability
that said phonetic estimate is a certain word or syllable from said context free grammar.

26. A semantic parser coupled to a database having a context free rich semantic grammar
(RSG) and configured to generate a set of semantic data as a function of a set of word
sequences and said RSG, wherein said sequences include words derived from a
phonetic stream and said RSG, and said set of semantic data includes all valid
interpretations of the sequences.

1 27. A semantic parser as in claim 26, wherein the RSG is a grammar tree comprised of a
2 plurality of nodes, one or more of said nodes including syntactic information and
3 semantic information.

1 28. A semantic parser as in claim 26, wherein said set of semantic data is a semantic tree.

1 29. A semantic tree evaluation tool coupled to an application program that defines a context
2 and coupled to a memory including a semantic tree representing all valid interpretations
3 of a phonetic stream, said evaluation tool configured to generate a linguistic result as a
4 single valid interpretation of said phonetic stream, in accordance with said context.

1 30. A semantic evaluation tool as in claim 29, wherein said semantic tree is comprised of a
2 plurality of nodes including semantic information, and wherein said semantic evaluation
3 tool is configured to determine at each of said nodes a category, as a function of said
4 context, and to apply to values at each node a corresponding category to determine said
5 linguistic result.